



Лектор курсу
Контактна інформація
лектора (e-mail)
Сторінка курсу в eLearn

СИЛАБУС ДИСЦИПЛІНИ

« Assessment of radiation risks for humans and environment »

Ступінь вищої освіти - Master
Спеціальність – 101 «Ecology»
Освітня програма « Ecology and Environmental Protection»
Рік навчання - 1-st, семестр 1-st
Форма навчання - full-time education
Кількість кредитів ЄКТС - 4
Мова викладання - English

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COURSE DESCRIPTION

The purpose of teaching the discipline "Assessment of radiation risks for humans and environment" is the formation of students' knowledge and skills for a comprehensive assessment of the impact on human health and the quality of the environment, objects of economic activity that use sources of ionizing radiation (NPP construction projects, operation of existing nuclear reactors, the Exclusion Zone, places of temporary localization of nuclear waste, etc.) in the scale of the chosen territory, provides skills for preliminary checking of compliance of projects with current legislation and safety requirements, guarantee of minimization of radioactive isotopes' intake to the human body with food products, skills in control and management of actions in the event of radiation accidents in order to assess the extent of pollution and radiation risks.

The task is to provide opportunities for using the acquired knowledge and skills for the description, analysis and prediction of radiation risks during the use of ionizing radiation sources under the conditions of limited information, as well as for the implementation of the master's thesis.

The student should know the characteristics of various types of ionizing radiation and the features of their interaction with living matter, the unit of measurement of radioactivity and doses of ionizing radiation, the basis of statistical processing of experimental data, sources of ionizing radiation in Ukraine and in the world.

STRUCTURE OF COARSE

Topic	Hours (lectures/ practical works)	Results of study	Task	Evaluation
Module 1. Ecological and radiation risk				
Topic 1. Scientific fundamentals of estimation and standardization of the effects of man-made systems on the environment	2/2	An ecological approach to the assessment of the state and regulation of the quality of the environment. Threshold and non-threshold concept. Environmental and sanitary regulation. Toxicological regulation of chemicals. Limit-permissible concentrations. Limit-permissible environmental	Delivery of practical work №1.	10 point

		load. Fields of influence; fields of concentration.		
Topic 2. Ecological risk and basic principles of environmental safety.	2/2	Natural and man-made catastrophic processes. The role of radiation factors in environmental risk for the population. Geochemical factors of ecological risk. Features of ecological risk and criteria for its assessment. An economic approach to security issues; cost estimation of risk; acceptable level of risk. Connection of the level of security with the economic opportunities of society. Social aspects of risk; perception of risks and society's reaction to them.	Delivery of practical work №2.	10
Topic 3. The main directions and methods of reducing the environmental risk	2/4	Environmental safety policy. Reducing the effects and compensating for the damage. Environmental Risk and Public Interaction. Placement of industrial facilities and environmental protection. Development and implementation of new technologies. Ecologically safe use of biotechnology.	Delivery of practical work №3.	10
Total module 1				30
Module 2. Theoretical and methodological bases of analysis and risk assessment				
Topic 4. Conceptually-methodical apparatus for analysis and risk assessment	2/2	Concepts of analysis and risk assessment. Methods of analysis and risk assessment. Models of analysis and risk assessment.	Delivery of practical work №4.	10
Topic 5. Formal means of constructing risk assessment models	2/2	System analysis. Expert methods and decision-making systems. Stochastic Modeling Techniques. Logic-probabilistic methods of safety research. Markov process. Poisson process. Method of statistical simulation of Monte Carlo.	Delivery of practical work №5.	10
Topic 6. Assessment of the risk related to the influence of ionizing radiation	2/2	Estimation of the dose absorbed by man due to the influence of ionizing radiation. Average doses of radiation of thyroid gland of children and adolescents of	Delivery of practical work №6.	10

		different regions of Ukraine. Radiation risk assessment.		
Total module 2				30
Module 3. The use of information technology for the assessment and prediction of radiation risks				
Topic 7. Assessment of radiological consequences of accidents using the COSYMA system	2/2	General information about COSYMA (Code System from MARIA). Three basic parts: the module for submitting input data, a software package and a module for submitting the results. Quantitative and qualitative characteristics of the incident. Calculation of individual and collective doses. Primary parameters groups: meteorological conditions, dispersion, parameters of sedimentation of radioactive particles, characteristics of the source of emissions, population density, consumption of products that may be contaminated, countermeasures, dose estimation and influence on public health, calculation of economic losses.	Delivery of practical work №7.	10
Topic 8. Analysis of the distribution of emissions (discharges) of toxic and radioactive contaminants in the environment using the MEPAS system	2/-	MEPAS - "Integrated Environmental Pollution Assessment System". Integral risk assessment for human health and the environment. Creating a plausible basis for optimizing (by economic indicators) measures that reduce risk and risk. Conducting an analysis of the feasibility of practical implementation (using available resources) of the measures provided for rehabilitation of the territories. Planning of rational actions and measures for prevention and restoration of the environment and reducing the negative impact on human health.	Delivery of practical work №8.	10
Topic 9. Features of the ERICA software package	2/2	Simplification for dose estimation of ionizing radiation. Concept for determining the dose for animals and humans. List of	Delivery of practical work №9.	10

		radioactive isotopes for which an assessment can be made. Assessment of doses from internal and external radiation.		
Topic 10. Modeling, forecasting and risk assessment using the CROM software package	2/2	Methodological basis of the program. Choice of model parameters: radioactive isotopes, radiation from radionuclides in air, soil, water, internal radiation due to consumption of contaminated food, due to inhaling radioactive isotopes with air. Prediction of the level of pollution of the territory at different distances from the source of emissions.	Delivery of practical work №10.	10
Total module 3				40
Additional points				10
Total for the semester (30+30+40)*0,7				70
Exam				30
Total for the course				100

EVALUATION POLICY

<i>Deadline and recompilation policy:</i>	Works that are submitted in violation of the deadlines for more than a week without good reason are evaluated at a lower score (maximum - 20% of the maximum). Rearrangement of modules takes place with the permission of the lecturer if there are good reasons (for example, hospital or family problems).
<i>Academic Integrity Policy:</i>	Writing while writing modular test papers and the final exam is prohibited. The use of mobile devices during these periods is also prohibited.
<i>Visiting policy:</i>	Attendance is mandatory. For objective reasons (for example, illness, international internship) training can take place individually (in online form in consultation with the dean of the faculty). In case of violations and abuses (non-attendance more than 50% of the time - non-admission to the exam)

STUDENT EVALUATION SCALE

Rating of the applicant of higher education, points	The assessment is national for the results of examinations	
	exams	offsets
90-100	perfectly	credited
74-89	good	
60-73	satisfactorily	
0-59	unsatisfactorily	not credited